



[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 23

[Docket No.FAA-2014-0155; Notice No. 23-262-SC]

Special Conditions: Extra Flugzeugproduktions and Vertriebs [Extra] GmbH, EA-300/LC; Acrobatic Category Aerodynamic Stability

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions.

SUMMARY: These special conditions are issued for the Extra EA-300/LC airplane. This airplane will have a novel or unusual design feature(s) associated with static stability. This airplane can perform at the highest level of aerobatic competition. To be competitive, the aircraft was designed with positive and, at some points, neutral stability within its flight envelope. Its lateral and directional axes are also decoupled from each other providing more precise maneuvering. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for these design features. These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards to EA-300/LC airplanes certified solely in the acrobatic category.

DATES: These special conditions are effective [INSERT DATE OF PUBLICATION IN FEDERAL REGISTER], and are applicable beginning April 25, 2014.

FOR FURTHER INFORMATION CONTACT: Mr. Ross Schaller, Federal Aviation Administration, Small Airplane Directorate, Aircraft Certification Service, 901 Locust, Room 301, Kansas City, Missouri 64106; telephone (816) 329-4162; facsimile (816) 329-4090.

SUPPLEMENTARY INFORMATION:

Background

On February 3, 2011, Extra GmbH applied for an amendment to Type Certificate No. A67EU to include the model number, EA-300/LC. The EA-300/LC, which is a derivative of the EA-300/L, currently approved under Type Certificate No. A67EU, is a single engine, two-place tandem canopy cockpit, low wing aerobatic monoplane with conventional landing gear.

Its maximum takeoff weight is 2095 pounds (950 kilograms). V_{NE} is 219 knots, V_{NO} is 138 knots, and V_A is 154 knots, indicated airspeed. Maximum altitude is 10,000 feet. The engine is a Lycoming AEIO-580-B1A with a rated power of 315 Horsepower (Hp) at 2,700 revolutions per minute (rpm). The airplane is proposed to be approved for Day-VFR operations with no icing approval. The EA-300/LC is certified under European Aviation Safety Agency (EASA) authority (Type Certificate Data Sheet EASA.A.362) as a dual category (normal/acrobatic) airplane.

Acrobatic airplanes previously type certificated by the FAA did comply with the stability provisions of part 23, subpart B. However, airplanes like the EA-300/LC are considered as “unlimited” acrobatic aircraft because they can perform at the highest level of aerobatic competition and can perform any maneuvers listed in the Aresti Catalog. The evolution of the “unlimited” types of acrobatic airplanes with very low mass, exceptional roll rates, and very high G capabilities, in addition to power to mass ratios that are unique to this type of airplane, have led to airplanes that cannot comply with the regulatory stability requirements. These airplanes

can still be type-certificated, but in the acrobatic category only and with special conditions and limitations.

The FAA will only consider certifying the EA-300/LC in the acrobatic category. Extra GmbH will not be able to offer a normal category-operating envelope to accommodate the increased fuel load designed for cross-country operations. The FAA does recognize that fuel exhaustion is one of the top accident causes associated with this class of aircraft. For this reason, the FAA proposes to allow Extra to seek certification of a limited acrobatic envelope at a higher weight that will still meet the minimum load requirements of $\pm 6/-3$ g associated with § 23.337. The EA-300/LC airplane would be approved for unlimited maneuvers at or below its designed unlimited acrobatic weight. The airplane would also be approved, at some higher weight (for fuel/passenger), that would still meet the requirements of § 23.337 for acrobatic category and may have restrictions on the maneuvers allowed.

Type Certification Basis

Under the provisions of 14 CFR 21.101, Extra GmbH must show that the EA-300/LC meets the applicable provisions of part 23, as amended by Amendment 23-34 effective September 14, 1987 and Special Condition 23-ACE-65, published in the Federal Register (57 FR 175), September 9, 1992. These regulations will be incorporated into Type Certificate No. A67EU after type certification approval of the EA-300/LC. The regulations incorporated by reference in the type certificate are commonly referred to as the "original type certification basis." The regulations incorporated by reference in A67EU are as follows:

14 CFR part 36, effective December 1, 1969, as amended by Amendments 36-1 through 36-28.

Not approved for ditching; compliance with provisions for ditching equipment in accordance with 14 FR 23.1415(a)(b) has not been demonstrated.

Approved for VFR-day only. Flight in known icing prohibited.

In addition, the certification basis includes other regulations, special conditions and exemptions that are not relevant to these special conditions. Type Certificate No. A67EU will be updated to include a complete description of the certification basis for this model airplane.

If the Administrator finds that the applicable airworthiness regulations (i.e., 14 CFR part 23) do not contain adequate or appropriate safety standards for the EA-300/LC because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

Special conditions are initially applicable to the model for which they are issued. Should the type certificate for that model be amended later to include any other model that incorporates the same or similar novel or unusual design feature, or should any other model already included on the same type certificate be modified to incorporate the same or similar novel or unusual design feature, the special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and special conditions, the EA-300/LC must comply with the fuel vent and exhaust emission requirements of 14 CFR part 34 and the noise certification requirements of 14 CFR part 36.

The FAA issues special conditions, as defined in 14 CFR 11.19, in accordance with § 11.38, and they become part of the type-certification basis under § 21.101.

Novel or Unusual Design Features

The Extra GmbH EA-300/LC will incorporate the following novel or unusual design features:

For acrobatic category airplanes with unlimited acrobatic capability:

Neutral longitudinal and lateral static stability characteristics

Discussion

The Code of Federal Regulations states static stability criteria for longitudinal, lateral, and directional axes of an airplane. However, none of these criteria is adequate to address the specific issues raised in the flight characteristics of an unlimited aerobatic airplane. Therefore, the FAA has determined after a flight-test evaluation that, in addition to the requirements of parts 21 and 23, special conditions are needed to address these static stability characteristics.

Discussion of Comments

Notice of proposed special conditions No. 23-14-01-SC for the Extra Flugzeugproduktions and Vertriebs (Extra) GmbH, EA-300/LC airplane was published in the Federal Register on March 18, 2014 (79 FR 15062). No comments were received, and the special conditions are adopted as proposed.

Applicability

As discussed above, these special conditions are applicable to the EA-300/LC. Should Extra GmbH apply at a later date for a change to the type certificate to include another model incorporating the same novel or unusual design feature, the special conditions would apply to that model as well.

Under standard practice, the effective date of final special conditions would be 30 days after the date of publication in the Federal Register; however, as the certification date for the Extra GmbH EA-300/LC is imminent, the FAA finds that good cause exists to make these special conditions effective upon issuance.

Conclusion

This action affects only certain novel or unusual design features on one model of airplanes. It is not a rule of general applicability.

List of Subjects in 14 CFR Part 23

Aircraft, Aviation safety, Signs and symbols.

Citation

The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701, 44702, 44704.

The Special Conditions

Accordingly, pursuant to the authority delegated to me by the Administrator, the following special conditions are issued as part of the type certification basis for Extra GmbH EA-300/LC airplanes.

1. Acrobatic Category Static Stability Requirements

SC23.171 Flight – General: Acrobatic category airplanes must be neutrally or positively stable in the longitudinal, directional, and lateral axes under Secs. SC23.173 through SC23.177. Additionally, the airplane must show suitable stability and control "feel" (static stability) in any condition normally encountered in service, if flight tests show it is necessary for safe operation.

SC23.173 Static longitudinal stability: Under the conditions specified in SC23.175 and with the airplane trimmed as indicated, the characteristics of the elevator control forces, positions, and the friction within the control system must be as follows:

(a) A pull on the yoke must be required to obtain and maintain speeds below the specified trim speed and a push on the yoke required to obtain and maintain speeds above the specified trim speed. This must be shown at any speed that can be obtained, except that speeds requiring a control force in excess of 40 pounds or speeds above the maximum allowable speed or below the minimum speed for steady unstalled flight need not be considered.

(b) The stick force or position must vary with speed so that any substantial speed change results in a stick force or position clearly perceptible to the pilot.

SC23.175 Demonstration of static longitudinal stability:

(a) Climb. The stick force curve must have, at a minimum, a neutrally stable to stable slope at speeds between 85 and 115 percent of the trim speed, with—

(1) Maximum continuous power; and

(2) The airplane trimmed at the speed used in determining the climb performance required by § 23.69(a).

(b) Cruise. With the airplane power and trim set for level flight at representative cruising speeds at high and low altitudes, including speeds up to V_{NO} , except the speed need not exceed V_H —

(1) The stick force curve must, at a minimum, have a neutrally stable to stable slope at all speeds within a range that is the greater of 15 percent of the trim speed plus the resulting free return speed range, or 40 knots plus the resulting free return speed range above and below the trim speed, except the slope need not be stable—

(i) At speeds less than $1.3 V_{S1}$; or

(ii) For airplanes with V_{NE} established under § 23.1505(a), at speeds greater than V_{NE} .

(c) Landing. The stick force curve must, at a minimum, have a neutrally stable to stable slope at speeds between $1.1 V_{S1}$ and $1.8 V_{S1}$ with—

(1) Landing gear extended; and

(2) The airplane trimmed at—

(i) V_{REF} , or the minimum trim speed if higher, with power off; and

(ii) V_{REF} with enough power to maintain a 3-degree angle of descent.

SC23.177 Static directional and lateral stability:

(a) The static directional stability, as shown by the tendency to recover from a wings level sideslip with the rudder free, must be positive for any landing gear and flap position appropriate to the takeoff, climb, cruise, approach, and landing configurations. This must be shown with symmetrical power up to maximum continuous power, and at speeds from $1.2 V_{S1}$ up to the maximum allowable speed for the condition being investigated. The angle of sideslip for these tests must be appropriate for the airplane type. At larger angles of sideslip, up to where full rudder is used or a control force limit in § 23.143 is reached, whichever occurs first, and at speeds from $1.2 V_{S1}$ to V_O , the rudder pedal force must not reverse.

(b) In straight, steady slips at $1.2 V_{S1}$ for any landing gear and flap positions, and for any symmetrical power conditions up to 50 percent of maximum continuous power, the rudder control movements and forces must increase steadily, but not necessarily in constant proportion, as the angle of sideslip is increased up to the maximum appropriate to the type of airplane. The aileron control movements and forces may increase steadily, but not necessarily in constant proportion, as the angle of sideslip is increased up to the maximum appropriate for the airplane type. At larger slip angles, up to the angle at

which the full rudder or aileron control is used or a control force limit contained in § 23.143 is reached, the aileron and rudder control movements and forces must not reverse as the angle of sideslip is increased. Rapid entry into, and recovery from, a maximum sideslip considered appropriate for the airplane must not result in uncontrollable flight characteristics.

Issued in Kansas City, Missouri on April 25, 2014.

Earl Lawrence,
Manager, Small Airplane Directorate,
Aircraft Certification Service.

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